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Viasat/Inmarsat comments on: Arrangements for Assignment of the Spectrum in the 6/7 GHz Band for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee

Dear Sir, Madam

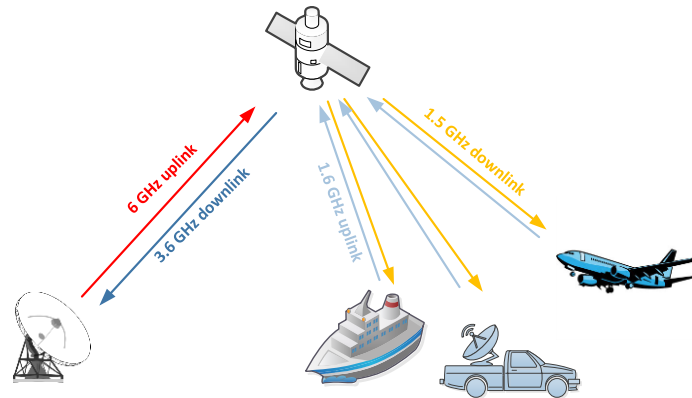
In this document, Inmarsat provides comments on the consultation paper: "Arrangements for Assignment of the Spectrum in the 6/7 GHz Band for the Provision of Public Mobile Services and the Related Spectrum Utilisation Fee". The Inmarsat business is now fully owned by Viasat, but the Inmarsat L-band MSS network continues to operate under the Inmarsat name.

The Inmarsat network of geostationary (GSO) satellites provides "ELERA" MSS services to millions of users around the globe. As illustrated in Figure 1, the Inmarsat L-band MSS network operates feeder links in C-band spectrum, including part of the upper 6 GHz band (6425-7125 MHz). Although there is no gateway station located in Hong Kong, Inmarsat's L-band MSS services are used by ships, aircraft and land users in and around Hong Kong. The ELERA services are used by the shipping industry globally to support day-to-day operations, crew connectivity and emergency and distress communications (including for GMDSS). The ELERA services are used by the aviation industry to support airline operations and air traffic control in Hong Kong and globally. ELERA land services include handheld satellite phones used by emergency workers, and IoT devices.

As Hong Kong is a major hub for international airlines and shipping, the Inmarsat ELERA MSS services contribute significantly to the economy.

These ELERA services rely on the use of parts of the C-band FSS spectrum for the operation of the feeder links. In the uplink (Earth-to-space) direction, the feeder links utilise the band 6425-6575 MHz, which partly overlap with the bands proposed for use of IMT/5G systems in Hong Kong. If interference was to occur to an Inmarsat GSO satellite, that would harm and potentially prevent service to hundreds of thousands of users across about one-third of the Earth surface, placing lives at risk.

Figure 1 – illustration of the Inmarsat network frequency arrangements

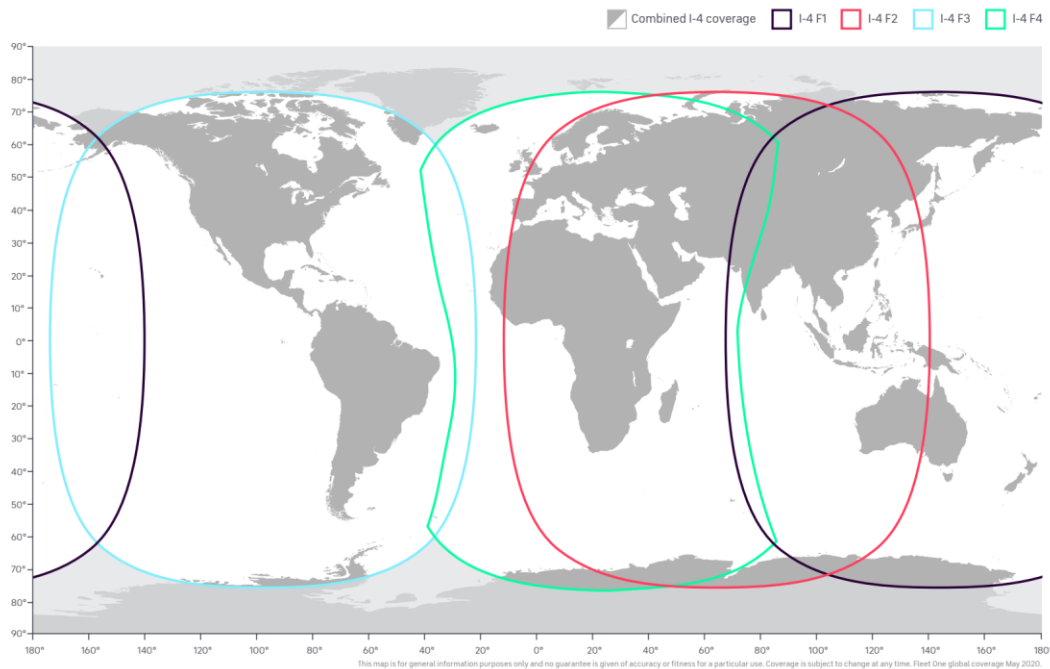


The full upper 6 GHz band (6425-7125 MHz) is being considered for potential IMT identification under WRC-23 agenda item 1.2. However, the majority of this band – 6425-7025 MHz – is being considered for identification only in ITU Region 1, which does not include Hong Kong.

There is no certainty that the band will be identified at WRC-23 for IMT in Region 1, let alone in Hong Kong. It is already clear that many administrations oppose the identification of the upper 6 GHz band for IMT identification in the RR. This is partly on the basis of planned alternative terrestrial use of the band - in particular many administrations have already made the band available for WLAN or Wi-Fi devices or are planning to do so. In addition, some administrations are opposing the identification of this band for IMT due to incompatibility with satellite uplinks, which operate under the primary FSS allocation in this band. Administrations should not deploy 5G or other IMT systems in bands/regions where there is no identification for IMT in the Radio Regulations and should not deploy 5G or other IMT systems where there is risk of causing harmful interference to satellite systems.

Inmarsat has conducted compatibility studies regarding the aggregate interference from IMT systems into GSO FSS satellite receivers. The studies need to consider the aggregate interference from IMT systems deployed in multiple countries visible to the satellite. As shown in the coverage map below, the I-4 F2 satellite (the red outline) can receive interference from almost all of Africa, almost all of Europe, the Middle East, and much of the Asia Pacific region, including Hong Kong. Inmarsat’s studies and other studies show that very stringent power limits are required on IMT systems to avoid harmful interference to satellite uplinks. Power reductions in excess of 20dB may be required, which effectively mean that the band could only be used for very low power IMT applications, if feasible at all. This conclusion is consistent with the previous ITU-R studies in Report ITU-R S.2367, which previously determined that only very low power indoor IMT applications would be compatible with FSS uplinks.

Figure 2 – Inmarsat ELERA satellite coverage



Inmarsat’s studies, and those of several industry members and administrations which have been submitted to the ITU-R, show harmful interference from even a low deployment density of IMT stations. While some other studies claim to show that interference would be acceptable, they are based on over-optimistic assumptions, such as excessive clutter loss and low density of IMT deployment. As a consequence, they under-estimate the actual interference that would occur.

Therefore, it cannot currently be concluded that the upper 6 GHz band may be used for IMT systems. Given the truly international nature of the interference with respect to GSO FSS satellites, it is vital that administrations work collectively, to study the issue carefully and ensure that all administrations are able to continue to make use of the long-standing frequency allocation to the FSS. While the consultation document notes that 3GPP has already included the upper 6 GHz band in its “NR” specifications, this action has been taken prematurely by the mobile industry, without any studies to assess the feasibility of deployment or the impact on other primary services.

Question 1 of the consultation document asks: *“Do you have any views on the proposed amendments to the HKTFA regarding the allocation of the 6425 – 7075 MHz band for mobile service with FS and FSS (Earth-to-space) on a co-primary basis?”* In answer to this question, Inmarsat recommends that the CA and SCED take no actions at this time to revise the Hong Kong Table of Frequency Allocations (“HKTFA”) or to plan for the auctioning of the upper 6 GHz band for 5G or IMT. Inmarsat recommends that the CA and SCED postpone any further action. Only if at some future time the upper 6 GHz band is identified for IMT in Hong Kong and measures to provide compatibility with FSS are agreed should this band be considered further for new 5G or IMT system deployment.



The CA and SCED may also want to consider whether spectrum in the upper 6 GHz band should be made available for WLAN/Wi-Fi devices, in line with several other countries. The use of these mobile applications can support broadband connectivity, and being much lower power than IMT, would ease coexistence with FSS uplinks. While some power/deployment limitations would be necessary, in particular to limit use to low power indoor and very low power outdoor devices, experience has shown that such limitations are acceptable to the Wi-Fi community.

Aside from Question 1, Inmarsat has no comment on the other questions posed in the consultation document, which relate to the details of the proposed authorisation for 5G systems.

Viasat/Inmarsat thanks the CA and SCED for the opportunity to comment.

A handwritten signature in blue ink, appearing to read "P Deedman". The signature is fluid and cursive.

Paul Deedman
Director, Spectrum Regulation
www.viasat.com